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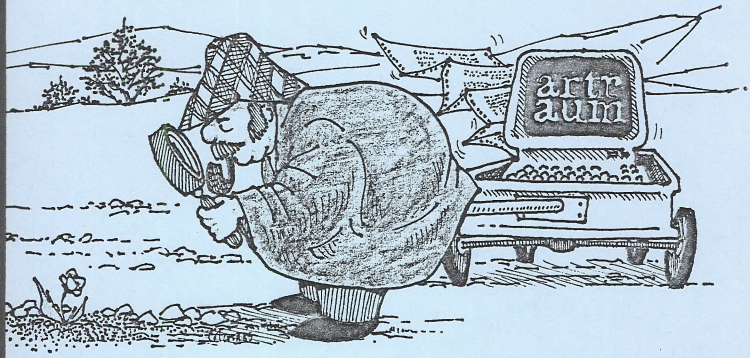

A121/RENO/XMONITOR

COMPUTER PROGRAM FOR ANALYSING MONITORING DATA

USERS GUIDE

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

NEVADA STATE OFFICE - DENVER SERVICE CENTER

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U S E R ' S G U I D E

A121/RENO/XMONITOR

An Interactive Program to Analyze Frequency and

Cover Monitoring Data

For the Bureau of Land Management

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Bur of Land Management

8:00 A.M. SEP 30 1985

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RENO, NEVADA

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AUGUST, 1985

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Preface and Summary of Program

Work on the Program A121/RENO/XMONITOR was started in 1981 in response to the Nevada Range Studies Task Group recommendations and Field Testing results, and finalized in 1985. This program was developed at the Service Center (SC) in coordination with the Nevada State Office (NSO). It is written in FORTRAN and uses Analysis of Variance (ANOVA) and Duncan's Multiple Range Test to compare data across the years to detect any significant changes. The basis for comparison is either by individual plant species or cover category.

The results of the program serve as a tool to aid the manager in identifying whether a significant change in the frequency or percent cover of a species or cover category has occurred between two or more years of data. The program does not attempt to identify or interpret the causes or reasons for a statistically signficant change. The causes or reasons for any differences must be determined after a careful review and evaluation of all the available data, i.e., utilization, actual use, precipitation, ecological status and any other impacting factors.

The program resides on the Honeywell DPS-8 computer at the SC and is interactive to facilitate field use. It performs three main tasks:

(1) It reads data files which are built from data taken directly off field data forms.

(2) It combines and compacts these data files into a data base.

(3) It analyzes the data contained in the data base.

The data files are built by the user using either the DPS-8 text editor or an ad hoc screen entry program, depending on the type of terminal available. The data files are then read by the program and are combined to create a data base. Each data base consists of one allotment with all its key areas.

The program queries the user for the level of significance desired for the analysis (.05 or .10) and the option of a detailed or abbreviated report of the results. The analysis is performed by plant species or cover category. Cover category can also be aggregated into litter and vegetation, and bare ground and rock combinations.

This User's Guide is designed to instruct and assist the field offices in the basic characteristics and uses of the program.

Logging on to the Honeywell DPS-8

Logging on to the DPS-8 requires the selection of a port class and program name, and then entering user identification and password information.

Dial in to the Nevada State Office port selector following directions as established and specified for your District Office or Resource Area. The NSO MICRO600 Series port selector menu will appear on the screen. Your choice of class will depend on whether you are going to build data files or to execute the program. If you are going to create data files using the text editor and you have an ADM available to you, use the ADM and choose Class 1. If you are going to build data files using the screen entry facility, then you must use a Tandberg terminal and you must choose Class 2. Class 2 will support screen entry. Class 1 will not. The program itself will execute and run from either class.

After a port is selected the computer will ask the question:

PROGRAM NAME?

Answer this question by entering TSS.

The computer will now respond with the following series of questions:

USER ID--

Enter your specific user ID.

PASSWORD—

MMMMMMMMMM

Enter your user password.

CHARGE CODE—

MMMMMMMMMM

Enter your user charge code.

CHARGE PASSWORD?

MMMMMMMMMM

Enter your user charge password.

Wait until you get the prompt "*". You are now logged on to the DPS-8.

Building a Data File

A. Text Editor.

Type in EDIT VERI and depress the XMIT key to call the text editor on the DPS-8. The computer will come back with a "-" symbol. Type in NEW and depress the XMIT key. The computer will come back with "enter" and a prompt "*". You begin entering the data directly from the field Frequency/Ground Cover Form (NV-6630-3, January 1984).

The header or identifier information at the top of the field form is always preceded by typing in an "H". The grass, forb, shrub, vegetative cover, bare ground, litter and rock data lines are always preceded by a G, F, S, V, B, L, or R, respectively. These letters are used as data identifiers. For the first line, after the prompt "*", type the data in the following order for the header:

	EXAMPLE HEADER
Type the letter "H"	
Date YYMMDD	810730
Number of Transects	10
Number of Quadrat/Transect	20
Wildlife Season of Use	12345
Big Game Range Name	BIG GAME
BLM Administrative Unit (ST/DI/RA/PU)	NV014801

Allotment	2114
Pasture	05
Key Area Number/Name	0005
Range Site (Habitat Type)	NVD25X18

The subsequent lines of entry will contain the actual dot count data. After the prompt "*", enter the data identifiers followed by a six alphanumeric character designator for the plant species name or cover class, the frame size, and the dot count in the following order:

	EXAMPLE DATA
Type the appropriate letter, G, F, S, V, B, L or R.	G
Six character designator.	POSE (Followed by two spaces so the full six spaces are used)
Frequency frame size. (Alphanumeric two fields)	30
Actual number of data hits recorded. (Numeric two fields)	17100708121108121115

Following the last line of data entry for a key area for a particular year, enter seven asterisks. These designate the end of that year's key area data file. If you have more than one key area for a particular year of data in the allotment, the next line of entry would be the new header information followed by the actual data, as above, until all the allotment key areas data for a

particular year have been entered. If there are no more data, depress the XMIT key. The computer will come back with the symbol "-". Type in SAVE and the data file name. The computer will come back with DATA SAVED, and the file name you designated, followed by a reprint of the first line of the data file, and then the symbol "-". Type in DONE to exit the text editor. An example of how this would appear is as follows:

```
 EDIT
-NEW
enter
*H810730102012345RIG GAMENV0148012114050005NVD25X18
*GPOSE 3017100708121106121115
*******
*
-SAVE LAHON1/TEST/BLDEDIT
DATA SAVED-BLDEDIT

H810730102012345RIG-GAMENV0148012114050005NVD25X18

-DONE
*
```

B. Screen Entry.

The screen data entry mode has been designed to facilitate data entry right off the field forms. Data are to be copied directly from the forms to the screen without any changes or computations.

Type in A121/RENO/XSCREEN. The first screen display is shown in Figure 1. The data are entered by filling in the outlined data fields. Once all fields on the screen have been filled, depress the XMIT key. This will transmit the whole screen of data to the computer. Until the XMIT key is depressed, corrections can be made by positioning the cursor to the desired position and retyping the data.

There are built-in editing features in this first screen. The DATE, NUMBER OF TRANSECTS and NUMBER OF QUADRAT fields can only accept numeric data. In addition, once the data are transmitted, the program checks the NO. OF TRANSECTS and the NO. OF QUADRAT values. They must be 5, 10, 15 or 20. If not, a message is printed on the STATUS field to that effect. Corrections can then be made by moving the cursor to the field in error, entering the correct number, and hitting the XMIT key again. Once all the data on the first screen are accepted, the second screen will be displayed. This screen is shown in Figure 2.

The second screen contains the data fields for the type, name and dot count of each individual plant or ground cover item. The DOT COUNT field can only accept numeric data. Once the data are transmitted, the program checks for plant or cover type codes, only accepting the letters G, F, S, V, B, L, R or A. If it is not one of these, a message appears on the STATUS line to that effect. The plant and cover type codes are: G for grass, F for Forbs, S for Shrubs, V for Vegetative Cover, B for Bare Ground, L for Litter, R for Rock and A for asterisks. The dot count values correspond to the actual number of species or cover category hits on the ground. In addition, the dot count values are checked against the value for the number of quadrats. For frequency data, dot count values must be less than or equal to the number of frames. For cover data, dot count values must be less than or equal to three times the number of frames. If the values input exceed these constraints, a message will appear on the STATUS line indicating the transect number that violates the constraint and a correction can now be made by moving the cursor to that field, inputting the correct value and XMITing the screen again.

Once all the dot count data have been input for a given key area, type A and XMIT to exit from the second screen mode. The program will now ask the question:

ANY MORE KEY AREAS IN THIS ALLOTMENT (Y or N)

Figure 1

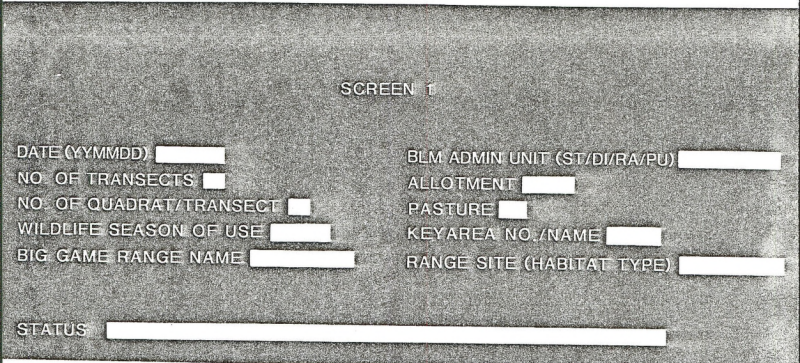
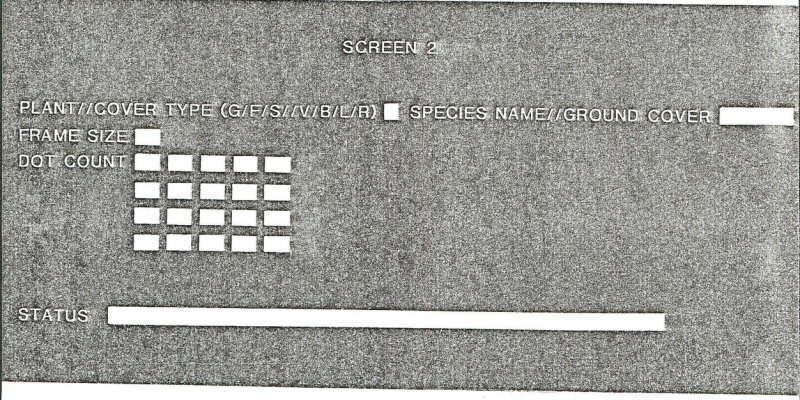


Figure 2



If more key areas are in the allotment, type Y and the program will return to the first screen. If not, type N. The program will now ask the following:

ENTER NAME OF PERMANENT FILE

Type in the file name under which you want to store the data for this allotment. The data names cannot be longer than eight characters and should contain the allotment number so that they can be easily recognized. A good practice is to use subcatalogs to eliminate congestion in the UMC. A recommended procedure for file names is to use the resource area name as a subcatalog designator. The file string structure could then be UMC/Resource Area/Allotment number.

To build a subcatalog, type in ACCESS under timeshare. The computer responds with FUNCTION?. Type in CC, which means "create catalog". The computer responds with CATALOG STRUCTURE TO WORKING LEVEL? Enter your user ID. The computer responds with NEWCATALOG NAME? Type in the catalog name you desire, using eight characters or less. The computer responds PASSWORD? Hit the XMIT key for this response and all subsequent responses until the computer responds with a prompt "*" placing you back in timeshare. For more details on the access subsystem refer to the Timesharing General Information Manual.

C. Example of Data File

The following is an example of a data file of cover and frequency data with 10 transects and 20 quadrats per transect.

```
LIST LAHON1/TEST/SAVAL81

H81073010201234581G GAMENV0148012114050005RANGESIT
GPOSE  3017100708121108121115
GSTHY  3012070812111011111312
BBARE  3030253537243023273131
LLITTER3003020306100808150506
VVEGE  3022282237201729182215
RROCK  3005020000060500000208
*******
H81072910201234581G GAMENV0148012114010004RANGESIT
GFEID  3013151214081413130911
FBASA3 3007131313080914070509
SARTR2 3002030602010403020304
BBARF  3030253537243023273131
LLITTER3003020306100808150506
VVEGE  3022282227201729182215
RROCK  3005020000060500000208
*******

*
```

Combining Data Files into a Data Base

The A121/RENO/XMONITOR program combines the data files that contain each year's data for a given allotment into a more efficient file structure prior to analyzing the data. This compact data structure is referred to in the program queries and in this manual as the "data base".

Let us illustrate this process with an example using data files that contain allotment data for the years 1981, 1983 and 1985. The example allotment is made up of two key areas and the data files contains both frequency and cover data.

Call the program by typing in A121/RENO/XMONITOR. The program will respond with:

```
DO YOU WANT TO UPDATE THE DATA BASE (YES, NO or NEW)?
```

Type in NEW for the first year of data.

```
=   NEW
```

The program responds:

```
ENTER NAME OF NEW DATA FILE
```

Type in the name of the data file that contains the first year of data.

= LAHON1/TEST/SAVAL81

The program responds:

DO YOU WANT TO PRINT THE UPDATED DATA BASE (YES or NO)?

The program has created a data base that contains the first year of data for the given allotment. Type YES, if you want to see the first year data base displayed.

= YES

The program will respond by printing out the data base in the following order, by line:

LINE 1

H12345BIG GAMENV014801211405000 5NVD25X18 6

H	First character identifier for the header record.
12345	Wildlife season of use.
BIG GAME	Big game range name.
NV014801	BLM administrative unit (ST/DI/RA/PU).

2114	Allotment number.
05	Pasture number.
0005	Key area number.
NVD25X18	Ecological site or habitat type.
6	Number of species and/or cover categories in the file.

LINE 2

GPOSE 30 1

G	First character identifer for a grass record.
POSEXX	Six character designator (X means spaces since this species name used only four characters and the program allows up to six characters).
30	Frequency frame size.
1	Indicates that there is one year of data in the file.

LINE 3

Y81073010201710 7 81211 8121115

Y	First character identifier for one year of data.
810730	Date (YYMMDD).
1020	Number of transects and quadrats.
17 - 15	Dot count for the number sampled in the field.

This sequence of lines repeats itself to the end of the data base file. An example of a data base file is as follows:

```
H12345BIG GAMENV0148012114050005RANGESIT  6
GPOSE  30 1
Y8107301020172107 7 81211 8121115
GSIHY  30 1
Y8107301020127 8121110111111312
BBARE  30 1
Y810730102030253537243023273131
LLITTER30 1
Y8107301020 3 2 3 610 8 815 5 6
VVEGE  30 1
Y810730102022282227201729182215
RROCK  30 1
Y8107301020 5 2 0 0 6 5 0 0 2 8
H12345BIG GAMENV0148012114010004RANGESIT  7
GFEID  30 1
Y8107291020131512148141313 911
FBASA3 30 1
Y8107291020 7131313 8 914 7 5 9
SARTR2 30 1
Y8107291020 2 3 6 2 1 4 3 2 3 4
BBARE  30 1
Y810729102030253537243023273131
LLITTER30 1
Y8107291020 3 2 3 610 8 815 5 6
VVEGE  30 1
Y810729102022282227201729182215
RROCK  30 1
Y8107291020 5 2 0 0 6 5 0 0 2 8

IF UPDATED DATA BASE TO BE SAVED, ENTER FILE NAME;
ELSE ENTER 'NO'
=
```

The program continues, after printing the data base, with:

```
IF UPDATED DATA BASE TO BE SAVED, ENTER FILE NAME;
ELSE ENTER 'NO'
```

Let us save the data base since we are going to add two more years of data to it. In selecting names of data bases, it is good practice to use "DB" as the first two letters of the data base name.

```
= LAHON1/TEST/DBS81
```

The program responds:

```
DO YOU WANT TO MAKE ANOTHER RUN (YES or NO)?
```

Since we have two more years of data, we enter YES to make another run.

```
= YES
```

The program responds:

DO YOU WANT TO UPDATE THE DATA BASE? (YES, NO or NEW)

To combine the 1981 data with the new 1983 data and compact them into the same allotment data base we enter YES.

= YES

The program responds:

ENTER NAME OF NEW DATA FILE

Enter the name of the data file that contains the 1983 data.

= LAHON1/TEST/SAVAL83

The program responds:

ENTER NAME OF OLD DATA BASE FILE

Enter the name of the 1981 data base file that we saved earlier.

= LAHON1/TEST/DBS81

The program responds:

DO YOU WANT TO PRINT THE OLD DATA BASE (YES or NO)?

Since we have already printed and reviewed the old data base, we will enter NO.

= NO

The program responds:

DO YOU WANT TO PRINT THE UPDATED DATA BASE?

Since we want to be certain that the second year was combined with the first, we respond YES.

= YES

The program will then print out the updated data base. The file layout is identical to the previous data base file for the first year's data. The only difference is that each plant species and/or cover category has been augmented by another year of data. An example is as follows:

H12345BIG GAMENV014801211405000 5RANGESIT 7
GFOSF 30 2
Y81073010201710 7 81211 8121115
Y8307261020201920202020202019 20
GS1HY 30 2
Y8107301020212 7 81211101111131 2
Y8307261020162016101111619181617
BBARE 30 2
Y8107301020302535372430232731 31
Y8307261020262431332026192327 27
LLITTER30 2
Y8107301020 3 2 3 610 8 815 5 6
Y8307261020 7 6 71014121219 910
VVEGE 30 2
Y8107301020222822272017291822 15
Y8307261020222822272017291822 15
RROCK 30 2
Y8107301020 5 2 0 0 6 5 0 0 2 8
Y8307261020 5 2 0 0 6 5 0 0 2 8
FLUPIN 30 1
Y8307261020 9 5 8 5 6 0 0 0 0 0
H12345BIG GAMENV014801211401000 4RANGESIT 7
GFEID 30 2
Y8107291020131512 14 8141313 911
Y8308051020 7 81212 81511151313
FBASA3 30 2
Y8107291020 7131313 8 914 7 5 9
Y8308051020121310 17 81811141015
SARTR2 30 2
Y8107291020 2 3 6 2 1 4 3 2 3 4
Y8308051020 1 4 2 5 0 4 4 6 5 1
BBARE 30 2
Y8107291020302535372430232731 31
Y8308051020262431332026192327 27
LL1TTER30 2
Y8107291020 3 2 3 610 8 815 5 6
Y8308051020 7 6 71014121219 910
VVEGE 30 2
Y8107291020222822272017291822 15
Y8308051020222822272017291822 15
RROCK 30 2
Y8107291020 5 2 0 0 6 5 0 0 2 8
Y8308051020 5 2 0 0 6 5 0 0 2 8

The program continues with:

```
IF UPDATED DATA BASE TO BE SAVED, ENTER FILE NAME;
ELSE ENTER 'NO'
```

We want to save this data base, so we enter the new data base file name.

```
= LAHON1/TEST/DBS83
```

The program responds:

```
DO YOU WANT TO ANALYZE THE DATA?
```

We could enter YES here and analyze the data, or enter NO. We will enter NO and leave the analysis to its own section of this user's guide.

```
= NO
```

The program responds:

```
DO YOU WANT TO MAKE ANOTHER RUN (YES or NO)?
```

Since this data base has three years' of data, we will enter YES. However, if was wanted to leave A121/RENO/XMONITOR, we would enter NO.

```
= YES
```

We now would continue exactly as we did for the 1983 data with the new 1985 data file. This is shown on next page.

```
DO YOU WANT TO MAKE ANOTHER RUN(YES OR NO)?
=YES
DO YOU WANT TO UPDATE THE DATA BASE?(YES,NO OR NEW)
=YES
ENTER NAME OF NEW DATA FILE
=LAHON1/TEST/SAVAL85
ENTER NAME OF OLD DATA BASE FILE
=LAHON1/TEST/DBS83
DO YOU WANT TO PRINT THE OLD DATA BASE(YES OR NO)?
=NO
DO YOU WANT TO PRINT THE UPDATED DATABASE(YES OR NO)?
=YES

H12345BIG GAMENV014801211405000SRANGESIT  8
GPOSE  30 3
Y81073010201710 7 81211 8121115
Y83072610202019202020202020201920
Y85062510202020201620201917201918
GSIHY  30 3
Y810730102012 7 8121110111111312
Y83072610201620161611161918161617
Y85062510202020701420181816171616
BBARE  30 3
Y81073010203025353724302327313l
Y83072610202624313320261923272 7
Y85062510202220272916121519232 3
LLITTER30 3
Y8107301020 3 2 3 610 8 815 5 6
Y8307261020 7 6 71014121219 910
Y8506251020 7 6 71014121219 910
VVEGE  30 3
Y81073010202228222720172918221 5
Y83072610202228222720172918221 5
Y85062510202632261242133222619
RROCK  30 3
Y8107301020 5 2 0 0 6 5 0 0 2 8
Y8307261020 5 2 0 0 6 5 0 0 2 8
Y8506251020 5 2 0 0 6 5 0 0 2 8
FLUPIN 30 2
Y8307261020 9 5 8 5 6 0 0 0 0 0
Y8506251020131110 311 0 0 0 0 0
SPUTR2 30 1
Y8506251020 0 1 0 0 0 0 0 0 0 0
H12345BIG GAMENV014801211401000 4RANGESIT  7
GFEID  30 3
Y810729102013151214 8141313 911
Y8308051020 7 81212 81511151313
Y8506281020 713121113 614 7 7 5
FBASA3 30 3
Y8107291020 7131313 8 914 7 5 9
Y83080510201213101 7 81811141015
Y85062810201014121417171510131 5
SARTR2 30 3
Y8107291020 2 3 6 2 1 4 3 2 3 4
Y8308051020 1 4 2 5 0 4 4 6 5 1
```

```
Y8506281020 3 5 3 5 2 4 6 7 6 7
BBARE  30 3
Y810729102030253537243023273131
Y830805102026243133202619232727
Y850628102022202729161215192323
LLITTER30 3
Y8107291020 3 2 3 610 8 815 5 6
Y8308051020 7 6 71014121219 910
Y8506281020 7 6 71014121219 910
VVEGE  30 3
Y810729102022282227201729182215
Y830805102022282227201729182215
Y850628102026322631242133222619
RROCK  30 3
Y8107291020 5 2 0 0 6 5 0 0 2 8
Y8308051020 5 2 0 0 6 5 0 0 2 8
Y8506281020 5 2 0 0 6 5 0 0 2 8

IF UPDATED DATA BASE TO BE SAVED, ENTER FILE NAME;
ELSE ENTER 'NO'
=LAHON1/TEST/DBS85
DO YOU WANT TO ANALYZE THE DATA(YES OR NO)?
=NO
```

Analyzing the Data

The A121/RENO/XMONITOR program performs four different types of operations on the cover and frequency data:

1. Converts the dot count data for each species or cover category to fractional data, based on the total number of frames per belt transect. Frequency dot counts are divided by the number of frames. Cover dot counts are divided by the number of frames times three (3).

2. Transforms the fractional data using an arc sine square root transformation. This transformation is required to normalize data expressed in fractional form when fractions cover the full range of values from 0 to 1.0. This transformation is particularly effective for fractions less than 0.2 and greater than 0.8.

3. Conducts an analysis of variance (ANOVA) on the transformed data for each plant species and cover category. The ANOVA computations are based on a randomized block design. The "treatments" are the years and the "replications" are the transects. The error term is the year x transect interaction. The ANOVA identifies whether there is a significant difference between two or more years of data or two or more transects. It does not indicate which years or transects are different. It determines if the difference is due to treatment (year) or is just a natural variation in the data collected.

4. Conducts a Duncan's multiple range test to compare differences between the (transformed) means. Duncan's test indicates which years are significantly different and which ones are not, for each plant species and cover category.

The first two operations are required to comply with the usual underlying assumption of normally distributed experimental errors in the ANOVA and Duncan's tests. Both the ANOVA test and the Duncan's multiple range test make comparisons among treatment means but the presentation of the results is different. ANOVA displays a table with the source of variation, sums of squares, mean squares, computed F values, and the probability of F values greater than or equal to the computed value of F. If the probability for the "years" source is less than the chosen level of significance, then it can be said that there is a significant difference between years. Similarly, if the probability for the "transects" source is less than the chosen level of significance, then there is a significant difference between transects.

The Duncan's test displays a table that shows the shortest significant range for comparison between means and the non-significant groupings. The shortest significant range gives the difference necessary for significance if a comparison is to be made across transformed ordered means. The non-significant groupings show which means are and which are not significantly different.

The program gives the option to the user of printing the full ANOVA and Duncan's results or just printing an abbreviated output which contains a statement indicating whether or not there is a difference between years at the chosen level of significance and table of the non-significant groupings. The abbreviated output has the advantage of brevity and simplicity and may be more attractive to the non-statistically inclined user.

For a detailed exposition of analysis of variance and Duncan's multiple range test, the user is referred to Steel and Torrie (1960, pp. 99-160), Adler and Roessler (1972, pp 288-315), Snedecor and Cochran (1971, pp 299-334) or any other standard statistics texts.

References

1. Principles and Procedures of Statistics, by
Steel and Torrie, McGraw Hill, 1960.

2. Introduction to Probability and Statistics, by
Adler and Roessler, W.H. Freeman & Co., 1972.

3. Statistical Methods, by
Snedecor and Cochran. Iowa State University Press, 1971.

Interpreting the Printout

Once the data files have been combined and compacted into a data base file for the allotment, we can conduct the analysis using A121/RENO/XMONITOR. The program will analyze both cover and frequency data at .05 or .10 level of statistical significance. It has the option of either an abbreviated or a detailed printout of the data analysis by plant species or cover category. The program will not analyze both cover and frequency at the same time. They are analyzed separately. If you analyze frequency first, then you have to cycle through the program again to analyze cover.

A. Frequency.

Let us analyze the data in the example used to illustrate the creation of a data base. The data base contains three years of data (1981, 1983 and 1985) for one allotment with two key areas with cover and frequency data. Call the program by typing in:

A121/RENO/XMONITOR

The program responds:

DO YOU WANT TO UPDATE THE DATA BASE? (YES, NO or NEW)

Since we already have a data base with three years of data and want to analyze the data we enter NO.

= NO

The program responds:

ENTER NAME OF DATA BASE FILE

Here we enter the data base file name we created after combining all three years of data.

= LAHON1/TEST/DBS85

The program responds:

ENTER PERCENT LEVEL OF SIGNIFICANCE (5 or 10)

We could enter either 5 or 10 here. If you want to run it at both levels, simply cycle through the program again. When you are analyzing the data, keep in mind that the 5 percent level detects finer changes in the data than the 10 percent level. If there is a significant change at the 5 percent level, it will always be significant at the 10 percent level. We will enter 10.

= 10

The program responds:

ENTER KEY AREA NUMBER
IF ALL KEY AREAS IN ALLOTMENT, ENTER 'ALL'

You can analyze either one key area or all key areas during one pass through the program. If you want to analyze less than all the key areas, but more than one, you need to cycle through the program for each key area. We will analyze one key area, number 0004. You must enter the entire four digit designation for the key area.

= 0004

The program responds:

ENTER F FOR FREQUENCY ANALYSIS; C FOR COVER

We will analyze frequency first. It is important to note that the analysis and all the printouts for frequency and cover are identical.

= F

The program responds:

DO YOU WANT THE DETAILED STATISTICAL PRINTOUT?

The program offers either an abbreviated or a detailed printout of the analysis results. The abbreviated version simply states whether or not there is a significant change between years, lists the raw data means and shows the non-significant groupings. The detailed version lists detailed tables of the ANOVA results and Duncan's Multiple Range Test, and is for the more statisically inclined user. We will look at the abbreviated printout first. Enter NO.

= NO

The program responds:

IF YOU WANT THE OUTPUT TO GO TO A PERM FILE, ENTER FILE NAME;
ELSE ENTER 'NO'

The program offers the option of outputting the results to a permanent file, instead of displaying them at the terminal. This option is advantageous if there are large amounts of output and the user wants to use a high speed printer to print the results. If a file name is entered, the terminal will not display the results. At the termination of the program, the permanent file can be directed to a high speed printer using the JPRINT command

or printed at the terminal using the LIST command.

Let us say that we respond NO to this question and want to see the results at the terminal as the program executes.

= NO

The program responds with the following abbreviated printout:

```
BLM ADMIN UNIT NV014801 ;WILDLIFE 12345 ;BIG GAME BIG GAME
CODE 2114-01-0004
PLANT SPECIES FEID

THERE IS NO SIGNIFICANT DIFFERENCE BETWEEN YEARS AT THE 0.10 LEVEL

YEAR     MEANS    NON-SIGNIFICANT GROUPINGS
  81     61.00    *
  83     57.00    *
  85     48.50    *


BLM ADMIN UNIT NV014801 ;WILDLIFE 12345 ;BIG GAME BIG GAME
CODE 2114-01-0004
PLANT SPECIES BASA3

THERE IS A SIGNIFICANT DIFFERENCE BETWEEEN YEARS AT THE 0.10 LEVEL

YEAR     MEANS    NON-SIGNIFICANT GROUPINGS
  85     68.50    *
  83     64.00    *
  81     49.00


BLM ADMIN UNIT NV014801 ;WILDLIFE 12345 ;BIG GAME BIG GAME
CODE 2114-01-0004
PLANT SPECIES ARTR2

THERE IS A SIGNIFICANT DIFFERENCE BETWEEEN YEARS AT THE 0.10 LEVEL

YEAR     MEANS    NON-SIGNIFICANT GROUPINGS
  85     24.00
  81     15.00    *
  83     16.00    *
```

In the abbreviated printout, Line 1 and Line 2 are the header information for the allotment. Line 2 specifically shows the allotment, pasture and key area numbers. Line 3 is the plant species being analyzed. Line 4 states whether or not ANOVA detected a change at the prescribed level of significance. The table that follows displays the raw data means by year. If there is no difference between the transformed means for the different years, the non-significant groupings column will display an asterisk for the years of data that are not significantly different.

The program follows the abbreviated printout with:

DO YOU WANT TO MAKE ANOTHER RUN (YES or NO)?

Since we want to look at the detailed version, we will enter YES.

= YES

The program responses and our inputs are exactly as we did for the abbreviated option except that we respond with a YES for the detailed printout.

The following is an example of the steps and of the detailed printout.

```
DO YOU WANT TO MAKE ANOTHER RUN(YES OR NO)?
=YES
DO YOU WANT TO UPDATE THE DATA BASE?(YES,NO OR NEW)
=NO
ENTER NAME OF DATA BASE FILE
=LAHON1/TEST/DBS85
DO YOU WANT TO PRINT THE DATA BASE(YES OR NO)?
=NO
ENTER PERCENT LEVEL OF SIGNIFICANCE(5 OR 10)
=5
ENTER KEY AREA NUMBER
IF ALL KEY AREAS IN ALLOTMENT, ENTER 'ALL'
=0005
ENTER F FOR FREQUENCY ANALYSIS; C FOR COVER
=F
DO YOU WANT THE DETAILED STATISTICAL PRINTOUT?
=YES
IF YOU WANT THE OUTPUT TO GO TO A PERM FILE, ENTER FILE NAME;
ELSE ENTER 'NO'
=LAHON1/TEST/PRINTOUT

DO YOU WANT TO MAKE ANOTHER RUN(YES OR NO)?
=NO

*LIST LAHON1/TEST/PRINTOUT


 BLM ADMIN UNIT NV014801 ;WILDLIFE 12345 ;BIG GAME BIG GAME
 CODE 2114-05-0005
 PLANT SPECIES POSE

 ANOVA RESULTS

      YEAR        RAW MEANS     TRANS. MEANS
        81            55.50          48.4224
        83            99.00          87.4158
        85            94.50          80.6372

 SOURCE      DF          SS              MS              F          PROB>F
 YEARS        2   8680.7610       4340.3805          64.86          0.0000
 TRANS.       9    911.7083        101.3009           1.51          0.2168
 ERROR       18   1204.5385         66.9188
 TOTAL       29  10797.0078

 STANDARD ERROR OF THE MEAN (TRANFORMED)                2.59
```

DUNCANS MULTIPLE RANGE TEST AT THE 0.05 SIGNIFICANCE LEVEL

SHORTEST SIGNIFICANT RANGE TABLE
(IF A COMPARISON IS TO BE MADE ACROSS M (TRANSFORMED) MEANS,
THE NECESSARY DIFFERENCE FOR SIGNIFICANCE IS S)

M =	2	3
S =	7.683	8.071

YEAR	RAW MEANS	TRANS. MEANS	NON-SIGNIFICANT GROUPINGS
83	99.00	87.4158	*
85	94.50	80.6372	*
81	55.50	48.4224	

BLM ADMIN UNIT NV014801 /WILDLIFE 12345 /BIG GAME BIG GAME
CODE 2114-05-0005
PLANT SPECIES SIHY

ANOVA RESULTS

YEAR	RAW MEANS	TRANS. MEANS
81	53.50	47.0146
83	79.50	65.2467
85	87.50	72.7438

SOURCE	DF	SS	MS	F	PROB>F
YEARS	2	3502.0213	1751.0107	12.93	0.0003
TRANS.	9	794.7588	88.3065	0.65	0.7398
ERROR	18	2437.5988	135.4222		
TOTAL	29	6734.3789			

STANDARD ERROR OF THE MEAN (TRANFORMED) 3.68

DUNCANS MULTIPLE RANGE TEST AT THE 0.05 SIGNIFICANCE LEVEL

SHORTEST SIGNIFICANT RANGE TABLE
(IF A COMPARISON IS TO BE MADE ACROSS M (TRANSFORMED) MEANS,
THE NECESSARY DIFFERENCE FOR SIGNIFICANCE IS S)

M =	2	3
S =	10.930	11.482

YEAR	RAW MEANS	TRANS. MEANS	NON-SIGNIFICANT GROUPINGS
85	87.50	72.7438	*
83	79.50	65.2467	*
81	53.50	47.0146	

BLM ADMIN UNIT NV014801 ;WILDLIFE 12345 ;BIG GAME BIG GAME
CODE 2114-05-0005
PLANT SPECIES LUPIN

ANOVA RESULTS

YEAR	RAW MEANS	TRANS. MEANS
83	16.50	17.4573
85	24.00	21.7254

SOURCE	DF	SS	MS	F	PROB>F
YEARS	1	91.0860	91.0860	2.87	0.1247
TRANS.	9	8177.6036	908.6226	28.60	0.0000
ERROR	9	285.9296	31.7700		
TOTAL	19	8554.6193			

STANDARD ERROR OF THE MEAN (TRANFORMED) 1.78

DUNCANS MULTIPLE RANGE TEST AT THE 0.05 SIGNIFICANCE LEVEL

SHORTEST SIGNIFICANT RANGE TABLE
(IF A COMPARISON IS TO BE MADE ACROSS M (TRANSFORMED) MEANS,
THE NECESSARY DIFFERENCE FOR SIGNIFICANCE IS S)

M = 2
S = 5.704

YEAR	RAW MEANS	TRANS. MEANS	NON-SIGNIFICANT GROUPINGS
85	24.00	21.7254	*
83	16.50	17.4573	*

BLM ADMIN UNIT NV014801 ;WILDLIFE 12345 ;BIG GAME BIG GAME
CODE 2114-05-0005
PLANT SPECIES PUTR2

DATA ONLY FOR YEAR 85

*

Lines 1, 2 and 3 are identical to the abbreviated printout. In this example we have merely changed the percent of level of significance to 5 percent, and selected key area 0005 rather than 0004.

The following discussion is meant to provide a general overview of the detailed statistical printout. Refer to a statistics text for more information.

The first table for the analysis of variance results (ANOVA) gives the raw and transformed means by year. The transformed means are the means of the data after the arc sine square root transformation.

The second table is the typical ANOVA table for two criteria of classification. The SOURCE, DF, SS, MS, F and PROB F are the column headings for the sources of variation, degrees of freedom, sums of squares, mean squares, F values and the probability of F values greater than or equal to the computed value of F, respectively. The "years", "transects", "error" and "total" are row designations for the years of data, numbers of transects, experimental error and totals of the column values, respectively.

In this example, the calculated "years" F value for POSE is 64.86 and the probability of an F value greater than 64.86 due only to chance variations between the years is 0.0000. Since this number is less than

the chosen 0.05 level of significance, one can then state that a significant difference exists between the years, at the 5% level, in the frequency of occurrence of the grass species POSE. The "transects" F value for POSE is 1.51 and the chance probability of an F value greater than 1.51 is 0.2168. Since this is so much greater than 0.05, there is no significant difference between transects, the only difference being that due to chance variations.

The standard error of the transformed means in the printout can be used to develop confidence intervals for the means.

The Shortest Significant Range Table for the Duncan's Multiple Range Test at the 0.05 significance level, can be used to calculate which of the years are significantly different. This is done by comparing the S for different M values to the difference between the means. The M values represent the number of transformed ordered means (years) compared. If the means being compared are arranged in order of magnitude, adjacent means having a difference greater than S_2 (S for M = 2) are considered significantly different. If the difference between the largest and smallest of any three consecutive means exceeds S_3, this difference is considered significant. In general, the difference between the largest and smallest of any M consecutive means is considered significant if it exceeds S_M.

Let us take POSE for example. When we subtract the ordered transformed means for POSE, 87.4158 - 80.6372 = 6.7786, and 80.6372 - 48.4224 = 32.2148 and compare these differences to S values, we find that since 6.7786 is less than 7.683, there is no significant difference between 1983 and 1985 data. Since 32.2148 is greater than 7.683, there is a significant difference between 1981 and 1985. To compare 1981 with 1983, we subtract the transformed means, 87.4158 - 48.4224 = 38.9934, and compare this with the S value for M equal to 3 or 8.071. Since 38.9934 is greater than 8.071, there is a significant difference between 1981 and 1983.

The non-significant groupings table that follows in the printout displays visually the results of the calculations performed above. For any given column under the "non-significant groupings" heading, any two or more means (years) displaying an asterisk indicates that the means are not significantly different. Conversely, any means in that column that do not display an asterisk, implies that those means are significantly different from the asterisk bearing means. In the POSE example considered, 83 and 85 carry an asterisk in the same column indicating that there is no significant difference between those two years. 81 bears no asterisk, hence it is significantly different from 83 and 85.

This format repeats itself for the rest of the plan species. The results on the detailed printout for the plan species LUPIN are an example with just two years of data, and the plant species PUTR2 shows the program's message to you when there is only one year of data.

B. Cover.

The following are examples of the detailed and abbreviated printouts for the analysis of cover data.

The only difference between the "frequency" and the "cover" options of the program is that the cover option allows the user either to analyze vegetation, litter, bare ground and rock separately, or to combine the "like" categories of vegetation and litter, and bare ground and rock, and analyze the aggregated categories. In the example that follows, we show the abbreviated format for both the combined and the separate analysis of cover data.

```
DO YOU WANT TO MAKE ANOTHER RUN(YES OR NO)?
=YES
DO YOU WANT TO UPDATE THE DATA BASE?(YES,NO OR NEW)
=NO
ENTER NAME OF DATA BASE FILE
=LAHON1/TEST/DBS85
DO YOU WANT TO PRINT THE DATA BASE(YES OR NO)?
=YES

H12345RIG GAMENV0148012114050005RANGESIT  8
GPOSE  30 3
Y8107301020171O 7 81211 8121115
Y8307261020201920202020201920
Y8506251020202016202019172019 18
OSIHY  30 3
Y8107301020127 8121111011111312
Y8307261020161620161011161918 1617
Y8506251020202014201818161716 16
BBARE  30 3
Y8107301020302535372430232731 31
Y8307261020262431332026192327 27
Y8506251020222027291612151923 23
LLITTER30 3
Y8107301020 3 2 3 610 8 815 5 6
Y8307261020 7 6 71014121219 910
Y8506251020 7 6 71014121219 910
VVEGE  30 3
Y8107301020222822272017291822 15
Y8307261020222822272017291822 15
Y8506251020226322631242133222617
RROCK  30 3
Y8107301020 5 2 0 0 6 5 0 0 2 8
Y8307261020 5 2 0 0 6 5 0 0 2 8
Y8506251020 5 2 0 0 6 5 0 0 2 8
FLUPIN 30 2
Y8307261020 9 5 8 5 6 0 0 0 0 0
Y8506251020131110 311 0 0 0 0 0
SPUTR2 30 1
Y8506251020 0 1 0 0 0 0 0 0 0 0
H12345RIG GAMENV0148012114010004RANGESIT  7
GFEID  30 3
Y8107291020131512141 8141313 911
Y8308051020 7 81212 81511151313
Y8506281020 913121113 614 7 7 5
FBASA3 30 3
Y8107291020 7131313 8 914 7 5 9
Y8308051020121310171 81811141015
Y8506281020101412141717151013 15
SARTR2 30 3
Y8107291020 2 3 6 2 1 4 3 2 3 4
Y8308051020 1 4 2 5 0 4 4 6 5 1
Y8506281020 3 5 3 5 2 4 6 7 6 7
BBARE  30 3
Y8107291020302535372430232731 31
Y8308051020262431332026192327 27
```

```
Y8506281020222027291612151923?3
LLITTER30 3
Y8107291020 3 2 3 610 8 815 5 6
Y8308051020 7 6 71014121219 910
Y8506281020 7 6 71014121219 910
VVEGE  30 3
Y8107291020222822272017291822?5
Y8308051020222282227201729182215
Y8506281020262322631242133222619
RROCK  30 3
Y8107291020 5 2 0 0 6 5 0 0 2 8
Y8308051020 5 2 0 0 6 5 0 0 2 8
Y8506281020 5 2 0 0 6 5 0 0 2 8

ENTER PERCENT LEVEL OF SIGNIFICANCE(5 OR 10)
=5
ENTER KEY AREA NUMBER
IF ALL KEY AREAS IN ALLOTMENT, ENTER 'ALL'
=0004
ENTER F FOR FREQUENCY ANALYSIS; C FOR COVER
=C
DO YOU WANT TO COMBINE VEGETATION AND LITTER,  BARE GROUND AND ROCK?
=NO
DO YOU WANT THE RETAILED STATISTICAL PRINTOUT?
=NO
IF YOU WANT THE OUTPUT TO GO TO A PERM FILE, ENTER FILE NAME;
ELSE ENTER 'NO'
=NO



BLM ADMIN UNIT NV014801 ;WILDLIFE 12345 ;BIG GAME BIG GAME
CODE 2114-01-0004
COVER TYPE      BARE

THERE IS A SIGNIFICANT DIFFERENCE BETWEEEN YEARS AT THE 0.05 LEVEL

YEAR     MEANS    NON-SIGNIFICANT GROUPINGS
  81     48.83
  83     42.67
  85     34.33


BLM ADMIN UNIT NV014801 ;WILDLIFE 12345 ;BIG GAME BIG GAME
CODE 2114-01-0004
COVER TYPE      LITTER

THERE IS A SIGNIFICANT DIFFERENCE BETWEEEN YEARS AT THE 0.05 LEVEL


YEAR     MEANS    NON-SIGNIFICANT GROUPINGS
  85     17.67    *
  83     17.67    *
  81     11.00
```

```
BLM ADMIN UNIT NV014801 ;WILDLIFE 12345 ;BIG GAME BIG GAME
CODE 2114-01-0004
COVER TYPE      VEGE

THERE IS A SIGNIFICANT DIFFERENCE BETWEEEN YEARS AT THE 0.05 LEVEL


YEAR    MEANS   NON-SIGNIFICANT GROUPINGS
  85    43.33
  83    36.67   *
  81    36.67   *



BLM ADMIN UNIT NV014801 ;WILDLIFE 12345 ;BIG GAME BIG GAME
CODE 2114-01-0004
COVER TYPE      ROCK

***PROG.  L$   (ERR #13)
SQRT     100
ANOVA   8010
ANALYS  4660
......   590
SQRT(-X) NOT ALLOWED
EVALUATE FOR +X
THERE IS NO SIGNIFICANT DIFFERENCE BETWEEN YEARS AT THE 0.05 LEVEL


YEAR    MEANS   NON-SIGNIFICANT GROUPINGS
  85     4.67   *
  83     4.67   *
  81     4.67   *

DO YOU WANT TO MAKE ANOTHER RUN(YES OR NO)?
=YES
DO YOU WANT TO UPDATE THE DATA BASE?(YES,NO OR NEW)
=NO
ENTER NAME OF DATA BASE FILE
=LAHON1/TEST/DBS85
DO YOU WANT TO PRINT THE DATA BASE(YES OR NO)?
=NO
ENTER PERCENT LEVEL OF SIGNIFICANCE(5 OR 10)
=5
ENTER KEY AREA NUMBER
IF ALL KEY AREAS IN ALLOTMENT, ENTER 'ALL'
=0004
ENTER F FOR FREQUENCY ANALYSIS; C FOR COVER
=C
DO YOU WANT TO COMBINE VEGETATION AND LITTER,  BARE GROUND AND ROCK?
=YES
DO YOU WANT THE DETAILED STATISTICAL PRINTOUT?
=NO
IF YOU WANT THE OUTPUT TO GO TO A PERM FILE, ENTER FILE NAME;
ELSE ENTER 'NO'
=NO
```

```
BLM ADMIN UNIT NV014801 ;WILDLIFE 12345 ;BIG GAME BIG GAME
CODE 2114-01-0004
COVER TYPES    V/L

THERE IS A SIGNIFICANT DIFFERENCE BETWEEEN YEARS AT THE 0.05 LEVEL

YEAR    MEANS   NON-SIGNIFICANT GROUPINGS
  85    30.50
  83    27.17
  81    23.83


BLM ADMIN UNIT NV014801 ;WILDLIFE 12345 ;BIG GAME BIG GAME
CODE 2114-01-0004
COVER TYPES    B/R

THERE IS A SIGNIFICANT DIFFERENCE BETWEEEN YEARS AT THE 0.05 LEVEL

YEAR    MEANS   NON-SIGNIFICANT GROUPINGS
  85    26.75
  83    23.67
  81    19.50

DO YOU WANT TO MAKE ANOTHER RUN(YES OR NO)?
=NO

*
```

In the results with the cover categories analyzed separately, the bare ground category shows a consistent decrease in cover. The litter and vegetation show variable change, but an overall increase in both occurs from 1981 to 1985. The results for ROCK display an error message that occurs when the data analyzed for every year are identical. See Appendix, Section B. As is evident in the example printout, when the categories are combined, this message does not occur because the bare ground values added to the rock result in differences between the years.

Appendix

A. Program Limitations.

The screen data input program A121/RENO/XSCREEN has the following restrictions:

- The number of transects must be either 5, 10, 15 or 20.
- The number of quadrats per transect must be either 5, 10, 15 or 20.

The data analysis program A121/RENO/OBJECT has the following restrictions:

- The maximum number of plant species is 100.
- The maximum number of belt transects is 20.
- The maximum number of years of data is 10.
- The maximum number of cover type is 4.

B. Error Messages.

A121/RENO/XMONITOR will generate the following error message:

. FIRST CHARACTER IN RECORD --------- is incorrect.

This message will appear if the plant species or cover type code on the input file is different from G, F, S, V, B, L or R. If the data files

are built using A121/RENO/XSCREEN, the edit features of that program will trap this error.

. THE NUMBER OF PLANTS IN THIS RECORD

EXCEEDS THE MAXIMUM NUMBER ALLOWED

This message will appear if the number of plants species exceed 100.

. THE NUMBER OF TRANSECTS IN THIS RECORD

EXCEEDS THE MAXIMUM NUMBER ALLOWED

This message will appear if the number of belt transects exceed 20. If the data files are built using A121/RENO/XSCREEN, the edit features of that program will trap this error.

. NO ALLOTMENT NUMBER IN DATA BASE

This message will appear if the allotment number or the key area numbers on the new data file do not correspond to the allotment number or key area numbers on the data base to be updated. It prevents the accidental mixing of data between allotments.

. THE NUMBER OF YEARS OF DATA FOR PLANT ----

EXCEEDS THE MAXIMUM NUMBER ALLOWED

This message will appear if the number of years of data for the plant in question exceeds 10.

. THE NUMBER OF COVERS IN THE RECORD

EXCEEDS THE MAXIMUM NUMBER ALLOWED

This message will appear if the number of cover types exceeds 4.

. PLANT ---- ALREADY HAS DATA FOR NEW YEAR

This message will appear if the data base and the new data file used to update the data base contain data for the same year.

In addition to the program error messages, the following system message may appear if there is no change whatsoever in the data from year to year for a given plant species or cover type:

SORT (-X) NOT ALLOWED

Since there is no change, the message will not affect the execution of the program.

C. Miscellaneous Remarks.

The program A121/RENO/XMONITOR has no internal edit routine for the plant species or cover class six character designators. The program was designed purposely without this edit to allow the field the flexibility to enter age class, form class or other additional entries for data analysis. However, it is necessary to use the same character designator symbols for the specific entry in an allotment key area for all the years of data. For example, if you enter GPOSE in 1981, you must enter GPOSE for 1983 and so on, or the data will not be compared and analyzed.

In building the data files it does not matter whether cover data are input before or after the frequency data. For the sake of consistency, a given convention should be adopted and maintained throughout the monitoring process.

If the files contain no cover data and the C option is specified in the analysis, the program will generate no output since there is nothing to output. Ergo, do not be surprised.

The program is geared to analyze allotment data. Each data file contains allotment data for a given year and the data bases built by the program will contain allotment data for one or more years. The allotment data files saved in the user's UMC should contain the data for the key areas

in the allotment. The user should retain the data base files built by A121/RENO/XMONITOR program that contain all the years of data. The intermediate data bases should be released. Also, all data files should be downloaded to removable disk and released from your UMC when not being used.

Control data elements in the allotment file are allotment number, key area number, pasture number, data, number of transects and number of frames. Range site, BLM administrative unit, big game and wildlife season of use are not control elements and may be left blank, if desired.

To get out of the program at anytime during execution, hit the SHIFT and BREAK keys. Type in REMC before calling the A121/RENO/XMONITOR program again to ensure that the files you wish to work with are not still tied up in the computer.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

GROUND COVER & FREQUENCY DATA

EXAMINER _____
DATE (YYMMDD) (1)
NO. OF TRANSECTS (2)
NO. OF QUADRAT/TRANSECT (3)
WILDLIFE SEASON OF USE (4)
BIG GAME RANGE NAME (5)

BLM ADMIN UNIT (ST/DI/RA/PU) (6)
ALLOTMENT _____ (7)
PASTURE _____ (8)
KEY AREA NO./NAME _____ (9)
RANGE SITE (HABITAT TYPE) (10)

RANDOM NUMBERS	TOTAL of 10 / FIRST 10 of 20	2L / 2L		17R / 7R		25R / 17R		37R / 20R		42R / 25R		52R / 29R		61R / 37R		69L / 40L		80L / 42R		85L / 45L		NO OF HITS	% FREQ. OF COVER
GROUND COVER	FRAME SIZE	1 DOT COUNT	NO	2 DOT COUNT	NO	3 DOT COUNT	NO	4 DOT COUNT	NO	5 DOT COUNT	NO	6 DOT COUNT	NO	7 DOT COUNT	NO	8 DOT COUNT	NO	9 DOT COUNT	NO	10 DOT COUNT	NO		
VEGETATION																							
BARE GROUND																							
LITTER																							
ROCK																							
FREQUENCY (SPECIES)																							
GRASSES																							
FORBS																							
SHRUBS																							

RANDOM NUMBERS TRANSECTS 11-20		52R	54L	61R	62L	69L	77L	80L	81R	85L	98R	NO. OF HITS	% FREQ. OR COVER
SPECIES	FRAME SIZE	11	12	13	14	15	16	17	18	19	20		
GRASSES													
FORBS													
SHRUBS													

1) Date: Enter date of data collection; year, month, day.
2) No. of Transects: Enter the number of transects (10 or 20) is the sampling scheme.
3) No. of Quadrats: Enter the number of quadrats (frequency frames) established in each transect.
4) Enter the appropriate season(s) symbol. Spring,(1); Summer,(2); Fall,(3); Winter,(4), Yearlong,(5). (E.g., Spring & Summer |1|2|_|_|_|, leave unused blocks blank.)
5) Common herd name (e.g. Duck Creek).
6) DE 0003 BLM Admin. Unit: Enter Administrative State Code (alpha) and the District, Resource Area, and Planning Unit numbers.
7) DE 0960 Allotment: Enter designated TMAS four character number.
8) DE 0905 Pasture: Enter pasture number, blank if none, (must be unique within the allotment.
9) Key Area Number: Enter four digit key area number (e.g. 0001 to 9999); these must be non-repetitious by Resource Area. Wildlife key area name would be e.g. KDWI.
10) DE 3520 Range (Ecological) Site Number: Enter range site number according to the following example:
D 26 A 001 ONU, where
D = Major Land Resource Region
26 = Major Land Resource Area
A = Subarea (if not subarea enter "X")
001 = Consecutive Site Number
and ONU = States in which range site is correlated, e.g. Ore., Nev., Utah.

MISCELLANEOUS
random marks: random marks (along the 100ft. baseline) are listed for the 10 and 20 transects sampling schemes, use the random marks on the top line for the 10 transect scheme; use the random marks on the bottom line for the 20 transect scheme (plots 1-10 on the front page, 11-20 on the back page).
species: list four letter code for each species encountered and enter by life form group, grasses, forbs, shrubs; enter the size of plot frame used to sample each individual species
number of hits: enter the total number of hits for each species or catigory.
%cover/frequency: equals the total hits for each species divided by 200 for frequency and 600 for cover data.

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D-553A, Building 50
Denver Federal Center
P. O. Box 25047
Denver, CO 80225-0047

Form 1279-3
(June 1984)
BORROWE
SF 85.6 .C65 A22
A121/RENO/XMONIT
DATE LOANED
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